

## AUTHOR INDEX

- Ackerman, F. G.**, and Myers, H. E. Factors influencing aggregation of claypan soils, 405-413.
- Albrecht, W. A.** Potassium in the soil colloid complex and plant nutrition, 13-21.
- Albrecht, W. A.**, Pettyjohn, W. J., and McLean, E. O. Magnesium depletion in relation to cropping systems and soil treatments, 447-455.
- Allison, L. E.** Trend of phosphate adsorption by inorganic colloids from Indiana soils, 333-342.
- Azar, E.** *See* **Elson, J.**
- Bailey, E. H.** Importance of agitation of soil suspension with glass electrode, 143-146.
- Batjer, L. P.** *See* **Cullinan, F. P.**
- Baver, L. D.** Practical applications of potassium interrelationships in soils and plants, 121-126.
- Bennett, E.** Some acidic properties of alkali lignin, 427-431.
- Bear, F. E.** *See* **Hunter, A. S.**
- Bodman, G. B.**, and Day, P. R. Freezing points of California soils and extracted clays, 225-246.
- Bower, C. A.** *See* **Pierre, W. H.**
- Bradfield, R.** *See* **Peech, M.**
- Bray, R. H.** *See* **DeTurk, E. E.**
- Brown, S. M.** *See* **Chapman, H. D.**
- Chapman, H. D.** *See* **Liebig, G. F., Jr.**
- Chapman, H. D.**, and Brown, S. M. Potash in relation to citrus nutrition, 87-100.
- Chase, F. E.** *See* **Lochhead, A. G.**
- Chepil, W. S.** Relation of wind erosion to water-stable and dry clod structure of soil, 275-287.
- Childs, E. C.** A note on electrical methods of determining soil moisture, 219-223.
- Codoni, M. R.** *See* **Gollan, J., Jr.**
- Colvin, W. S.**, and Eisenmenger, W. S. Relationships of natural vegetation to water-holding capacity of New England soils, 433-446.
- Cullinan, F. P.**, and Batjer, L. P. Nitrogen, phosphorus, and potassium interrelationships in young peach and apple trees, 49-60.
- Day, P. R.** *See* **Bodman, G. B.**
- DeTurk, E. E.**, Wood, C. K., and Bray, R. H. Potash fixation in corn belt soils, 1-12.
- Drosdoff, M.** *See* **Nikiforoff, C. C.**
- Duley, F. L.** *See* **McCalla, T. M.**
- Eisenmenger, W. S.** *See* **Colvin, W. S.**
- Elgabaly, M. M.**, Jenny, H., and Overstreet, R. Effect of type of clay mineral on zinc and potassium uptake by barley roots, 257-263.
- Elson, J.**, and Azar, E. Distribution of total and alkali-soluble organic matter between whole soil and soil aggregates of Dunmore silt loam: I, 177-183.
- Gardner, R.** *See* **Whitney, R. S.**
- Gollan, J., Jr.**, and Codoni, M. R. Application of controlled dispersion to textural grading of soils, 417-426.
- Goodding, T. H.** *See* **McCalla, T. M.**
- Graham, E. R.** Soil development and plant nutrition: II, 265-273.
- Greaves, J. E.** *See* **Jones, L. W.**
- Haley, D. E.**, and Reid, J. J. Bearing of potassium on quality of tobacco, 79-85.
- Heinze, P. H.** *See* **Smith, G. E.**
- Hunter, A. S.** Response of alfalfa to identical Ca-K ratios in soil and sand cultures, 361-369.
- Hunter, A. S.**, Toth, S. J., and Bear, F. E. Calcium-potassium ratios for alfalfa, 61-72.
- Jenny, H.** *See* **Elgabaly, M. M.**
- Jones, L. W.**, and Greaves, J. E. Azotobacter chroococcum and its relationship to accessory growth factors, 393-404.
- Kardos, L. T.** *See* **Zobler, L.**
- Kelly, J. B.**, and Midgley, A. R. Phosphate fixation—an exchange of phosphate and hydroxyl ions, 167-176.
- Kunin, R.** Microdetermination of iron by mercurous nitrate method, 457.
- Liebig, G. F., Jr.**, Vanselow, A. P., and Chapman, H. D. Suitability of water purified by synthetic ion-exchange resins for growing plants in controlled nutrient cultures, 371-376.
- Lee, C. K.** Chemical characteristics of the great soil groups of China, 343-349.
- Lochhead, A. G.**, and Chase, F. E. Qualitative studies of soil microorganisms: V, 185-195.

- McCalla, T. M.**, Duley, F. L., and Goodding, T. H. Measuring plant residue fragments of soil, 159-166.
- McLean, E. O.** *See* **Albrecht, W. A.**
- MacIntire, W. H.**, Shaw, W. M., Robinson, B., and Young, J. B. Potassium retention from annual additions of chloride, sulfate, and nitrate, as influenced by limestone and by dolomite, 321-332.
- Maehl, K. A.** *See* **Rost, C. O.**
- Magistad, O. C.**, and Reitemeier, R. F. Soil solution concentrations at the wilting point and their correlation with plant growth, 351-360.
- Midgley, A. R.** *See* **Kelly, J. B.**
- Murneck, A. E.** *See* **Smith, G. E.**
- Myers, H. E.** *See* **Ackerman, F. G.**
- Myers, H. E.**, and Smith, F. W. Swelling of quartz sand, soil colloid, and organic colloid, 253-255.
- Newman, A. S.**, and Norman, A. G. Activity of subsurface soil populations, 377-391.
- Nightingale, G. T.** Physiological-chemical functions of potassium in crop growth, 73-78.
- Nikiforoff, C. C.**, and Drosdoff, M. Genesis of a claypan soil: I, 459-482.
- Norman, A. G.** *See* **Newman, A. S.**
- Overstreet, R.** *See* **Elgabaly, M. M.**
- Peech, M.**, and Bradfield, R. Effect of lime and magnesia on soil potassium and on absorption of potassium by plants, 37-48.
- Peterson, J. B.** Formation of water-stable structure in puddled soil, 289-300.
- Pettyjohn, W. J.** *See* **Albrecht, W. H.**
- Pierre, W. H.**, and Bower, C. A. Potassium absorption by plants as affected by cationic relationships, 23-36.
- Rader, L. F., Jr.**, White, L. M., and Whitaker, C. W. The salt index—measure of effect of fertilizers on concentration of soil solution, 201-218.
- Reid, J. J.** *See* **Haley, D. E.**
- Reitemeier, R. F.** *See* **Magistad, O. C.**
- Robinson, B.** *See* **MacIntire, W. H.**
- Rost, C. O.**, and Maehl, K. A. Some solodized soils of Red River Valley, 301-312.
- Scarseth, G. D.** Plant-tissue testing in diagnosis of nutritional status of plants, 113-120.
- Shaw, W. M.** *See* **MacIntire, W. H.**
- Smith, G. E.**, Heinze, P. H., and Murneck, A. E. Effect of soil moisture and rainfall on chemical transformations in cyanamid granules, 313-320.
- Smith, F. W.** *See* **Myers, H. E.**
- Stewart, A. J.** A soil tube for obtaining wet clay cores in an undisturbed structural condition, 247-251.
- Toth, S. J.** *See* **Hunter, A. S.**
- Ulrich, A.** Plant analysis as a diagnostic procedure, 101-112.
- Vanselow, A. P.** *See* **Liebig, G. F., Jr.**
- White, L. M.** *See* **Rader, L. F., Jr.**
- Whitney, R. S.**, and Gardner, R. Effect of carbon dioxide on soil reaction, 127-141.
- Whittaker, C. W.** *See* **Rader, L. F., Jr.**
- Wood, C. K.** *See* **DeTurk, E. E.**
- Young, J. B.** *See* **MacIntire, W. H.**
- Zobler, L.**, and Kardos, L. T. Exchangeable cation status and structure of Palouse silty clay loam as influenced by various cropping and fertility practices, 147-158.

## SUBJECT INDEX

- Absorption by plants—
  - nitrate, effect of potassium, 73-74
  - potassium, effect of—
    - cationic relationships, 23-36
    - lime and magnesia, 44-45
- Aggregation in claypan soils, effect of—
  - crop rotation, 407-410
  - sod, 410-411
- Alfalfa, effect of calcium-potassium ratios, 61-72, 361-367
- Azotobacter chroococcum*—
  - effect of growth factors on nitrogen fixation, 395
  - synthesis of growth factors, 395-402

### BOOKS

- Bennett, H. H., and Pryor, W. C. *This Land We Defend*, 200
- Bunce, A. C. *Economics of Soil Conservation*, 197
- Chemical Dictionary, New Commercial, 199
- Chemistry, Handbook of, 198
- Cox, J. F., and Jackson, L. *Field Crops and Land Use*, 197
- Crafts, A. S. *See* Robbins, W. W.
- Distillers' Grain Manual, 415
- Drainage, Field, Principles of, 199
- Economics of Soil Conservation, 197
- Engeln, O. D. von. *Geomorphology*, 198
- Field Crops, 197
- Field Crops and Land Use, 197
- Food for Thought, 197-198
- Foscue, E. J. *See* White, C. L.
- Fuel, farm production of alcohol, Food for Thought, 197-198
- Geography, Regional, of Anglo-America, 415
- Geomorphology, 198
- Guerrero, A. P. *New Commercial Chemical Dictionary*, 199
- Humphreys, W. J. *Ways of the Weather*, 200
- Jackson, L. *See* Cox, J. F.
- Kolacher, P. J. *See* Wilkie, H. F.
- Krusekopf, H. H. (Editor). *Life and Work of C. F. Marbut*, 198
- Land Use, Field Crops and, 197
- Lange, N. A. *Handbook of Chemistry*, ed. 4, 198
- Life and Work of C. F. Marbut, 198
- Marbut, C. F., *Life and Work of*, 198
- Mather, R. S. *See* Wilkie, R. T.
- Nicholson, H. H. *Principles of Field Drainage*, 199
- Peats of New Jersey and Their Utilization, 199
- Pryor, W. C. *See* Bennett, H. H.
- Rather, H. C. *Field Crops*, 197
- Raynor, R. N. *See* Robbins, W. W.
- Robbins, W. W., Crafts, A. S., and Raynor, R. N. *Weed Control*, 200
- Soil Conservation, Economics of, 197
- Soil conservation, *This Land We Defend*, 200
- Soil erosion, *Geomorphology*, 198
- Waksman, S. A. *Peats of New Jersey and Their Utilization, Part A*, 199
- Weather, Ways of the, 200
- Weed Control, 200
- White, C. L., and Foscue, E. J. *Regional Geography of Anglo-America*, 415
- Wilkie, R. T., and Mather, R. S. *Distillers' Grain Manual*, 415
- Wilkie, H. F., and Kolacher, P. J. *Food for Thought*, 197

- Calcium-potassium ratios—
  - for alfalfa—
    - exchangeable cations removed from soil, 67, 71
    - relation to crop yield, 64-70
    - soil and plant relationships, 70
  - in soil and sand cultures, response of alfalfa, 361-367
  - of colloids, effect on plant composition, 15-18
- Carbon dioxide, effect on soil reaction, 127-141
- Cations—
  - effect on potassium absorption by plants, 23-36
  - exchangeable, in soil, 147-159
  - movement between soil and plant, 18-20
  - removal from soil by alfalfa, 67-68
- China, great soil groups—
  - exchangeable bases, 346-347
  - ferrous iron in paddy soils, 348
  - manganese, 347
  - molecular ratios of colloid fraction, 343-345
  - organic matter, 349
  - pH and lime content, 345-346
  - phosphate fixation, 347-348
  - phosphorus, available, 347-348
  - soluble salts, 348
  - texture, 349
  - titanium, 347
- Citrus—
  - effect of potassium on plant composition, 94-98
  - foliar diagnosis for determining potassium status, 98
  - potassium deficiency symptoms—
    - effect of nutrient variables, 96
    - lemon cuttings, 92-94
    - orange and grapefruit seedlings, 91-92
- Clay—
  - cores, wet, tube for obtaining, 247-251

- Clay—(continued)  
 freezing point, *see* Freezing points, soils and clays
- Claypan soils—  
 aggregation in, 407-411  
 Dayton silt loam—  
   chemical composition, 476-481  
   mechanical composition, 474-476  
   morphology, 466-474
- Colloids, organic, swelling of, 253-255
- Cyanamid granules, effect of moisture, 313-320
- Erosion, wind, relation to water-stable and dry clod structure, 275-289
- Fertilizers, salt index of—  
 calculation, 211-213  
 choice of basis, 217-218  
 definition, 210-211  
 validity of calculated values, 213-215
- Freezing points, soils and clays—  
 effect of structure alteration, 237-240  
 measurement—  
   apparatus, 226-228  
   moisture correction, 231  
   preparation of sample, 230  
   technique, 230-231
- Fruit trees, peach and apple—  
 deficiency symptoms—  
   nitrogen, 54  
   phosphorus, 55  
   potassium, 54-57  
 nitrogen, phosphorus, and potassium interrelationships, 49-60  
 nutrient level, value of leaf analysis for determination, 57-59  
 nutrient supply, effect on growth and leaf composition, 50-54
- Glass electrode, soil pH determination with, 143-146
- Ion-exchange resins, *see* Resins, synthetic ion-exchange
- Iron, microdetermination by mercurous nitrate method, 457
- Lignin, alkali—  
 acidic groups—  
   qualitative aspects, 429-430  
   quantitative aspects, 428-429  
 acidic properties, 427-431
- Lime, effect on potassium retention by soil, 321-332
- Magnesium—  
 decrease in soil after liming, 452  
 depletion in soil, relation of cultural practice, 447-455  
 in Missouri soils, 447-449
- Mechanical analysis, soil—  
 control of operations—  
   direct methods, 422-425  
   indirect methods, 425  
 preparation of sample—  
   disaggregation by rubbing, 421  
   dispersion of colloid, 418-419  
   dispersion technique, 421-422  
   oxidation of organic matter, 420-421
- Microorganisms, *See* Soil microorganisms
- Nitrate reduction by plants, effect of potassium, 74-75
- Nitrogen—  
 deficiency symptoms in peach and apple, 54  
 relation to fruit tree nutrition, 49-60
- Organic matter, in soil and soil aggregates, 177-185
- Plant analysis, as diagnostic procedure—  
 critical concentration of nutrient, 102  
 for nutritional status—  
   Purdue method, 113-115  
   value in fertility research, 116-119  
 generalized plant nutrient equation, 104-105  
 nutrient balance, 109-110  
 nutrient combination in plants, 108  
 nutrient concentration and yield, 108-109  
 practical applications, 110  
 sampling frequency, 106  
 sampling technique, 109  
 selection of part, 106-108  
 stage of growth and data evaluation, 108
- Plant residues, fragments in soil, method for measuring, 159-167
- Phosphate—  
 adsorption by inorganic colloids, 333-342  
 fixation—  
   effect of dehydration, 170-171  
   effect of sesquioxide removal, 171  
   exchange of phosphate and hydroxylions, pH changes resulting from, 168-170  
   mechanism, 173-174
- Phosphorus—  
 deficiency symptoms, peach and apple, 55  
 fixed, effect of pH of extracting solution on liberation, 172-173  
 relation to fruit tree nutrition, 49-60
- Potash, *see* Potassium
- Potassium—  
 absorption by plants, effect of—  
   ammonia, 28-29  
   calcium and magnesium, 24-27  
   cationic relationships, 23-33  
   iron, 29

- manganese, 29-30
- sodium, 27-28
- absorption, influence of cations, factors affecting—
  - cation concentration, 30-31
  - kind of cation, 31
  - kind of plant, 31-32
  - pH of solution, 32
  - potassium level, 30
  - presence of other cations, 31
- deficiency and plant composition, 94-96
- deficiency symptoms—
  - citrus, effect of nutrient variables, 87-96
  - peach and apple, 54-56
- fixation in soil—
  - effect of anion, 8-9
  - effect of lime and magnesia, 39-44
  - significance, practical and economic, 10-11
- fixed, status in soil, 7-8
- functions, physiological and chemical in plant growth—
  - carbohydrate reserves, 75
  - cell division, 77-78
  - nitrate absorption, 73-74
  - nitrate reduction, 74-75
  - structure of stems, 77
- in soil colloid complex, relation to—
  - other cations, 14-15
  - plant nutrition, 13-21
  - soil development, 13-14
- interrelationships in soils and plants, practical applications—
  - farm management systems, 122-125
  - fertilization methods, 125
  - potassium requirement of crop, 121-122
  - potassium-supplying power of soil, 122
- movement between soil and plant, 18-20
- relationship to—
  - fruit tree nutrition, 49-60, 87-100
  - tobacco quality, 79-85
- release from soil colloids—
  - fixed, 9-10
  - native, 4-5
- retention by soil, influence of lime and dolomite, 321-332
- soil, effect of lime and magnesia, 37-48
- uptake by barley roots—
  - effect of clay mineral, 257-264
  - from K-bentonite and K-kaolinite, 258-259
  - significance of free electrolytes, 261-262
- Potassium-calcium ratios, *see* Calcium-potassium ratios
- Resins, synthetic ion-exchange, water purification by, 371-376
- Salt index, *see* Fertilizers, salt index of
- Sand—
  - quartz, swelling of, 253-255
  - separates, composition, relation to soybean, 265-273
- Silt separates, composition, relation to soybeans, 265-273
- Soil—
  - aggregation, *see* Aggregation
  - bases, exchangeable, *see* Cations
  - cations, *see* Cations
  - China, *see* China, great soil groups
  - claypan, genesis of—*see also* Claypan soils
  - calculating segregation results, 464-466
  - migration and segregation, 460-462
  - parent material quotient, 462-463
  - volume factor, 463-464
  - colloids, inorganic—
    - phosphate adsorption by, 333-342
    - phosphate retention, effect of exchangeable calcium, 339-340
  - colloids, swelling of, 253-255
  - development, relation to potassium of colloid, 13-14
  - freezing point, *see* Freezing points
  - magnesium, *see* Magnesium
  - mechanical analysis, *see* Mechanical analysis
  - microorganisms—
    - bacterial flora, nutritional requirements, 185-195
    - nutritional groups, incidence in soil, 187-188
    - nutritional groups, relation to biochemical properties, 189
    - nutritional groups, relation to morphological types, 188-189
    - requiring soil extract, 189-190
    - subsurface populations, activity, 377-391
  - moisture—
    - effect on transformations in cyanamid granules, 313-320
    - electrical methods for determining, 219-223
  - organic matter, effect of cropping and fertility practices, 153; *see also* Organic matter
  - plant residue fragments in, measurement, 159-167
  - potassium, *see* Potassium

## Soil—(continued)

puddled, water-stable structure formation in—

aggregate development, effect of organic matter, 293-296

aggregate morphology, effect of organic matter, 296-297

uniformity of aggregate formation, 292-293

reaction, as affected by—

aeration, 137

carbon dioxide, 127-141

dilution, 136

time of standing, 138

varying conditions, 137

reaction, glass electrode determination, effect of agitation of soil suspensions, 143-146

series, analyses, descriptions of, or experiments with—

Aiken, 229, 238, 241-243, 259; Almasipi, 282; Altamont, 229, 238, 241; Antioch, 229, 241; Barnes, 267-268; Berthoud, 128; Cajon 355; Calhoun, 321-332; Cass, 128; Cecil, 204, 214; Chester, 204, 214; Cincinnati, 333-340; Cisne, 2, 6, 10, 267, 268; Clarion, 267-268, 378-391; Clinton, 378-391; Corning, 105; Creedmoor, 124; Crosby, 118, 119; Cumberland, 321-332; Dayton, 466-482; Ducor, 144; Dunmore, 177-182; Dutchess, 62, 361-367; Ephrata, 355; Fayette, 378-391; Fort Collins, 128, 355; Frederick, 333-340; Fresno, 145; Gila, 128, 355; Gloucester, 144; Greenfield, 144; Greenville, 236; Hagerstown, 204, 214; Hanford, 229, 241; Hartsells, 204, 214, 321-332; Hatton, 282; Haverhill, 282; Havre, 137; Hays, 267-268; Hermon, 169, 170, 171; Herrick, 2, 6, 10; Hesperia, 355; Holland, 229, 241-243; Houston, 249; Hyrum, 267-268; Imperial, 355; Indio, 355; Kaweah, 145; Lamora, 144; Lindley, 378-391; Lufkin, 267-268; Marion, 378-391; Marshall, 378-391; Marsh Creek, 144; Memphis, 313-320; Merced, 355; Miami, 39-40, 333-340; Millville,

355; Mohave, 128; Neville, 128; Norfolk, 204, 214, 216; Oakley, 144, 229, 241; Oasis, 355; Oxbow, 282; Palouse, 147-158, 355; Parsons, 405; Putnam, 267-268; Red River, 282; Regan, 355; Regina, 282; Sable, 2, 6, 10; Sacramento, 144; San Joaquin, 144-145; Sassafras, 55, 204, 214; Shelby 378-391, 449; Sierra, 229, 241; Stockton, 229, 241-243; Superstition, 355; Tama, 2, 6, 10, 289-301; Terry, 128; Tujunga, 105, 109; Vergennes, 170-171; Vina, 229, 241-243; Waskada, 282; Webster, 25, 26; Weld, 128; West Logan, 236; Woodston, 405-413; Wynoose, 2, 6; Yolo, 229, 241-243, 259, 355.

solodized, Red River Valley, 301-311

solution, concentration at wilting point—composition, 356-359

correlation with plant growth, 351-360

solution, effect of—

fertilizers on osmotic pressure, 206

fertilizers on salt concentration, 201-218

varying soil moisture on osmotic pressure, 215-217

structure—

effect of cultural practices, 147-159

water-stable and dry clod, relation to wind erosion, 275-289

water-stable, formation in puddled soil, 289-301

textural grading, application of controlled dispersion, 417-426

water-holding capacity, relationship of natural vegetation, 433-449

Soybeans, relation of composition of sand and silt separates to growth and composition, 265-273

Tobacco, relationship of potassium to quality, 79-85

Water-holding capacity, *see* Soil, water-holding capacity

Zinc, uptake by barley roots—

effect of clay mineral, 257-264

from Zn-bentonite, 257-258

from Zn-Kaolinite, 257-258

significance of free electrolytes, 261-262

olk,  
41;  
47-  
68;  
na,  
44;  
04,  
29,  
ber-  
01;  
er-  
43;  
eld,  
05-  
43,

t-

360

218  
res-

to

oil,

lled

of

and

om-

to

ter-

-262